# SR&D TEKS Alignment First Semester

| (c) Knowledge and skills. | | | Six Weeks Module | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (1) | | The student, for at least 40% of instructional time, conducts laboratory and field investigations using safe, environmentally appropriate, and ethical practices. These investigations must involve actively obtaining and analyzing data with physical equipment, but may also involve experimentation in a simulated environment as well as field observations that extend beyond the classroom. The student is expected to: | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| | (A) | demonstrate safe practices during laboratory and field investigations; and | | 23 | 23 | | 3 | 12 | | | 3 | | 13 | 1 | 123 | | |
| | (B) | demonstrate an understanding of the use and conservation of resources and the proper disposal or recycling of materials. | | 23 | 23 | | 3 | 13 | 2 | | | | | 1 | 12 | | |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (2) | | The student uses a systematic approach to answer scientific laboratory and field investigative questions. The student is expected to: | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| | (A) | know the definition of science and understand that it has limitations, as specified in subsection (b)(1) of this section; | | 3 | | | 2 | | 1 | | | | | | 2 | 1 | |
| | (B) | know that scientific hypotheses are tentative and testable statements that must be capable of being supported or not supported by observational evidence. Hypotheses of durable explanatory power which have been tested over a wide variety of conditions are incorporated into theories; | | | | 2 | | | | | 23 | | 3 | 1 | 123 | | |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (2) | Continued: The student uses a systematic approach to answer scientific laboratory and field investigative questions. The student is expected to: | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| | (C) | know that scientific theories are based on natural and physical phenomena and are capable of being tested by multiple independent researchers. Unlike hypotheses, scientific theories are well-established and highly-reliable explanations, but may be subject to change as new areas of science and new technologies are developed; | | | | | | | | | | 1 | | | | | |
| | (D) | distinguish between scientific hypotheses and scientific theories; | | | | | | | | | | 1 | | | | | |
| | (E) | design and implement investigative procedures, including making observations, asking well-defined questions, formulating testable hypotheses, identifying variables, selecting appropriate equipment and technology, and evaluating numerical answers for reasonableness; | 3 | 23 | 23 | 23 | 23 | 23 | 2 | | | | 1 | 1 | | | |
| | (F) | (F) collect and organize qualitative and quantitative data and make measurements with accuracy and precision using tools such as calculators, spreadsheet software, data-collecting probes, computers, standard laboratory glassware, microscopes, various prepared slides, stereoscopes, metric rulers, electronic balances, gel electrophoresis apparatuses, micropipettors, hand lenses, Celsius thermometers, hot plates, lab notebooks or journals, timing devices, cameras, and meter sticks; | 2 | 23 | 23 | | | 1 | | | | | | | 12 | | |
| | (G) | analyze, evaluate, make inferences, and predict trends from data; | | | | 3 | 23 | 2 | 2 | | | | | | | 1 | |
| | (H) | identify and quantify causes and effects of uncertainties in measured data; | | | | | | 3 | 2 | | 3 | | | | | | |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (2) | Continued: The student uses a systematic approach to answer scientific laboratory and field investigative questions. The student is expected to: | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| | (I) | organize and evaluate data and make inferences from data, including the use of tables, charts, and graphs; and | | | | 2 | 23 | 23 | 2 | | 3 | | 3 | | 23 | | |
| | (J) | communicate valid conclusions supported by the data through various methods such as lab reports, labeled drawings, graphic organizers, journals, summaries, oral reports, and technology-based reports. | | 3 | | | | 3 | 2 | | 3 | | 3 | | 123 | 1 | |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (3) | The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to: | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| | (A) | in all fields of science, analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student; | | | | | | | | | | | | | | | |
| | (B) | communicate and apply scientific information extracted from various sources such as current events, news reports, published journal articles, and marketing materials; | 1 | 1 | 1 | | | | | | | | | | | | |
| | (C) | draw inferences based on data related to promotional materials for products and services; | | | | | | | | | | | | | | | |
| | (D) | explain the impacts of the scientific contributions of a variety of historical and contemporary scientists on scientific thought and society; | | | | | | | | | | | | | | | |
| | (E) | research and describe the connections between science and future careers; and | 1 | 1 | 1 | | | | | | | | | | | | |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (3) | Continued: The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to: | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| | (F) | express and interpret relationships symbolically in accordance with accepted theories to make predictions and solve problems mathematically, including problems requiring proportional reasoning and graphical vector addition. | | | | | 12 | 1 | 1 | | | | | | | | |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (4) | The student formulates hypotheses to guide experimentation and data collection. The student is expected to: | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| | (A) | perform background research with respect to an investigative problem; and | | | | | | | | | | | | | | | |
| | (B) | examine hypotheses generated to guide a research process by evaluating the merits and feasibility of the hypotheses. | | | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (5) | The student analyzes published research. The student is expected to: | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| | (A) | identify the scientific methodology used by a researcher; | | | | | | | | | | | | | | | |
| | (B) | examine a prescribed research design and identify dependent and independent variables; | 3 | 3 | | | | 3 | 2 | | | | | | | 1 | |
| | (C) | evaluate a prescribed research design to determine the purpose for each of the procedures performed; and | | | | | | | | | | | | | | | |
| | (D) | compare the relationship of the hypothesis to the conclusion. | | | | | | 3 | 2 | | | | | | | 1 | |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (6) | The student develops and implements investigative designs. The student is expected to: | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| | (A) | interact and collaborate with scientific researchers and/or other members of the scientific community to complete a research project; | | | | | | | | | | | | | | | |
| | (B) | identify and manipulate relevant variables within research situations; | 3 | 3 | 3 | | | | | | | | | | | | |
| | (C) | use a control in an experimental process; and | | | | | | | | | | | | | | | |
| | (D) | design procedures to test hypotheses. | | | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (7) | The student collects, organizes, and evaluates qualitative and quantitative data obtained through experimentation. The student is expected to: | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| | (A) | record observations and events as they occur within an investigation; | | | | | 3 | 2 | 1 | | 3 | | 3 | | 123 | | |
| | (B) | acquire, manipulate, and analyze data using equipment and technology; | | | | | | | | | | | | | | | |
| | (C) | construct data tables to organize information collected in an experiment; and | | | | | 3 | 2 | 1 | | 3 | | 3 | | 123 | | |
| | (D) | evaluate data using statistical methods to recognize patterns, trends, and proportional relationships. | | | | | | 3 | 2 | | | | | | | | |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (8) | The student knows how to synthesize valid conclusions from qualitative and quantitative data. The student is expected to: | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| | (A) | synthesize conclusions supported by research data; | | | | | 2 | | | | | | | | | | |
| | (B) | consider and communicate alternative explanations for observations and results; and | | | | | | 3 | 2 | | 3 | | 3 | | 3 | 1 | |
| | (C) | identify limitations within the research process and provide recommendations for additional research. | | | | | | 3 | | | | | | | | | |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (9) | The student communicates conclusions clearly and concisely to an audience of professionals. The student is expected to: | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| | (A) | construct charts, tables, and graphs in facilitating data analysis and in communicating experimental results clearly and effectively using technology; and | | | | | | 3 | 2 | | | | | | 1 | 1 | |
| | (B) | suggest alternative explanations from observations or trends evident within the data or from prompts provided by a review panel. | | | | | | 3 | 2 | | | | | | 1 | 1 | |

# SR&D TEKS Alignment Second Semester

| (c) Knowledge and skills. | | | Six Weeks Module | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (1) | | The student, for at least 40% of instructional time, conducts laboratory and field investigations using safe, environmentally appropriate, and ethical practices. These investigations must involve actively obtaining and analyzing data with physical equipment, but may also involve experimentation in a simulated environment as well as field observations that extend beyond the classroom. The student is expected to: | D&D Loop | Problem Statemnt | Research | Design Calculations | Drawings | Decision Making | CDR | Material Acquisistion | Fabrication | FRR/TRR | Launch | PMA | Presentation |
| | (A) | demonstrate safe practices during laboratory and field investigations; and | | | | | | | | | ✓ | ✓ | ✓ | ✓ | |
| | (B) | demonstrate an understanding of the use and conservation of resources and the proper disposal or recycling of materials. | | | | | | ✓ | | ✓ | ✓ | | | ✓ | |

| (2) | | The student uses a systematic approach to answer scientific laboratory and field investigative questions. The student is expected to: | D&D | Prob | Res | Calcs | Dwgs | Dec | CDR | Mat Aq | Fab | F/TRR | Lnch | PMA | Pres. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (A) | know the definition of science and understand that it has limitations, as specified in subsection (b)(1) of this section; | | | | | | | | | | | | | |
| | (B) | know that scientific hypotheses are tentative and testable statements that must be capable of being supported or not supported by observational evidence. Hypotheses of durable explanatory power which have been tested over a wide variety of conditions are incorporated into theories; | | ✓ | ✓ | | | | | | | | | | |

| (2) | Continued: The student uses a systematic approach to answer scientific laboratory and field investigative questions. The student is expected to: | D&D | Prob | Res | Calcs | Dwgs | Dec | CDR | Mat Aq | Fab | F/TRR | Lnch | PMA | Pres. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (C) know that scientific theories are based on natural and physical phenomena and are capable of being tested by multiple independent researchers. Unlike hypotheses, scientific theories are well-established and highly-reliable explanations, but may be subject to change as new areas of science and new technologies are developed; | | | | | | | | | | | | | |
| | (D) distinguish between scientific hypotheses and scientific theories; | | | | | | | | | | | | | |
| | (E) design and implement investigative procedures, including making observations, asking well-defined questions, formulating testable hypotheses, identifying variables, selecting appropriate equipment and technology, and evaluating numerical answers for reasonableness; | | ✓ | ✓ | ✓ | ✓ | | | | | | | | |
| | (F) collect and organize qualitative and quantitative data and make measurements with accuracy and precision using tools such as calculators, spreadsheet software, data-collecting probes, computers, standard laboratory glassware, microscopes, various prepared slides, stereoscopes, metric rulers, electronic balances, gel electrophoresis apparatuses, micropipettors, hand lenses, Celsius thermometers, hot plates, lab notebooks or journals, timing devices, cameras, and meter sticks; | | | | | | | | | | | ✓ | ✓ | |
| | (G) analyze, evaluate, make inferences, and predict trends from data; | | | | | | | | | | | | ✓ | |
| | (H) identify and quantify causes and effects of uncertainties in measured data; | | | ✓ | | | | | | | | | ✓ | |

| | | | D&D | Prob | Res | Calcs | Dwgs | Dec | CDR | Mat Aq | Fab | F/TRR | Lnch | PMA | Pres. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (2) | Continued: The student uses a systematic approach to answer scientific laboratory and field investigative questions. The student is expected to: | | | | | | | | | | | | | | |
| | (I) | organize and evaluate data and make inferences from data, including the use of tables, charts, and graphs; and | | | | | | | | | | | | ✓ | |
| | (J) | communicate valid conclusions supported by the data through various methods such as lab reports, labeled drawings, graphic organizers, journals, summaries, oral reports, and technology-based reports. | | | | | | | | | | | | ✓ | ✓ |

| | | | D&D | Prob | Res | Calcs | Dwgs | Dec | CDR | Mat Aq | Fab | F/TRR | Lnch | PMA | Pres. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (3) | The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to: | | | | | | | | | | | | | | |
| | (A) | in all fields of science, analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student; | | | | | | | | | | | | | |
| | (B) | communicate and apply scientific information extracted from various sources such as current events, news reports, published journal articles, and marketing materials; | | | | | | | | | | | | | |
| | (C) | draw inferences based on data related to promotional materials for products and services; | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | | |
| | (D) | explain the impacts of the scientific contributions of a variety of historical and contemporary scientists on scientific thought and society; | | | | | | | | | | | | | |
| | (E) | research and describe the connections between science and future careers; and | | | | | | | | | | | | | |

| (3) | Continued: The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to: | | D&D | Prob | Res | Calcs | Dwgs | Dec | CDR | Mat Aq | Fab | F/TRR | Lnch | PMA | Pres. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (F) | express and interpret relationships symbolically in accordance with accepted theories to make predictions and solve problems mathematically, including problems requiring proportional reasoning and graphical vector addition. | | | | | | | | | | | | | |

| (4) | The student formulates hypotheses to guide experimentation and data collection. The student is expected to: | | D&D | Prob | Res | Calcs | Dwgs | Dec | CDR | Mat Aq | Fab | F/TRR | Lnch | PMA | Pres. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (A) | perform background research with respect to an investigative problem; and | | ✓ | ✓ | ✓ | ✓ | | | | | | | | |
| | (B) | examine hypotheses generated to guide a research process by evaluating the merits and feasibility of the hypotheses. | | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | | | |

| (5) | The student analyzes published research. The student is expected to: | | D&D | Prob | Res | Calcs | Dwgs | Dec | CDR | Mat A | Fab | F/TRR | Lnch | PMA | Pres. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (A) | identify the scientific methodology used by a researcher; | | | | | | | | | | | | | |
| | (B) | examine a prescribed research design and identify dependent and independent variables; | | | | | | | | | | | | | |
| | (C) | evaluate a prescribed research design to determine the purpose for each of the procedures performed; and | | | | | | | | | | | | | |
| | (D) | compare the relationship of the hypothesis to the conclusion. | | | | | | | | | | | | ✓ | |

| (6) | The student develops and implements investigative designs. The student is expected to: | D&D | Prob | Res | Calcs | Dwgs | Dec | CDR | Mat A | Fab | F/TRR | Lnch | PMA | Pres. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (A) interact and collaborate with scientific researchers and/or other members of the scientific community to complete a research project; | | | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | (B) identify and manipulate relevant variables within research situations; | | | ✓ | ✓ | ✓ | | | | | | | ✓ | |
| | (C) use a control in an experimental process; and | | | | | | | | | | | | | |
| | (D) design procedures to test hypotheses. | | | | | | | | | | | | | |

| (7) | The student collects, organizes, and evaluates qualitative and quantitative data obtained through experimentation. The student is expected to: | D&D | Prob | Res | Calcs | Dwgs | Dec | CDR | Mat Aq | Fab | F/TRR | Lnch | PMA | Pres. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (A) record observations and events as they occur within an investigation; | | | | | | | | | | | ✓ | ✓ | |
| | (B) acquire, manipulate, and analyze data using equipment and technology; | | | | | | | | | | | | ✓ | |
| | (C) construct data tables to organize information collected in an experiment; and | | | | | | | | | | | | ✓ | |
| | (D) evaluate data using statistical methods to recognize patterns, trends, and proportional relationships. | | | | | | | | | | | | ✓ | |

| (8) | The student knows how to synthesize valid conclusions from qualitative and quantitative data. The student is expected to: | D&D | Prob | Res | Calcs | Dwgs | Dec | CDR | Mat Aq | Fab | F/TRR | Lnch | PMA | Pres. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (A) synthesize conclusions supported by research data; | | | | | | | | | | | | ✓ | |
| | (B) consider and communicate alternative explanations for observations and results; and | | | | | | | | | | | | ✓ | ✓ |
| | (C) identify limitations within the research process and provide recommendations for additional research. | | | | | | | | | | | | ✓ | ✓ |

| (9) | The student communicates conclusions clearly and concisely to an audience of professionals. The student is expected to: | | D&D | Prob | Res | Calcs | Dwgs | Dec | CDR | Mat Aq | Fab | F/TRR | Lnch | PMA | Pres. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (A) | construct charts, tables, and graphs in facilitating data analysis and in communicating experimental results clearly and effectively using technology; and | | | | | | | | | | | | ✓ | ✓ |
| | (B) | suggest alternative explanations from observations or trends evident within the data or from prompts provided by a review panel. | | | | | | | | | | | | ✓ | ✓ |